MYCOTAXON

ISSN (print) 0093-4666 (online) 2154-8889 Mycotaxon, Ltd. ©2017

April–June 2017—Volume 132, pp. 441–444

https://doi.org/10.5248/132.441

Lecanora shangrilaensis sp. nov., on pinecones from China

Lei Lü [1] & Zun-Tian Zhao [2]*

[1] *College of Food Science and Engineering, Qilu University of Technology*
Jinan, 250353, China
[2] *College of Life Sciences, Shandong Normal University*
Jinan, 250014, China

* Correspondence to: *ztzhao@sohu.com*

Abstract—*Lecanora shangrilaensis* from southwestern China is described as a new species. It can be distinguished from other multispored species of *Lecanora* by the presence of usnic acid instead of atranorin and the epruinose discs with coarse granular epihymenium. It is otherwise characterized by the thin thallus, yellow to yellowish brown apothecial disc, 12–16-spored ascus, and the pinecone substrate.

Key words—East Asia, *Lecanoraceae*, lichenized *Ascomycota*, taxonomy

Introduction

Nine multispored species of *Lecanora* are known: *L. bruneri* Imshaug & Brodo, *L. cateilea* (Ach.) A. Massal., *L. japonica* Müll. Arg., *L. loekoesii* Y. Joshi et al., *L. subjaponica* L. Lü & H.Y. Wang, *L. weii* L.F. Han & S.Y. Guo, *L. pleospora* Müll. Arg., *L. praesistens* Nyl., and *L. strobilinoides* Giralt & Gómez-Bolea (Giralt & Gómez-Bolea 1991; Guderley & Lumbsch 1999; Han et al. 2009; Lü et al. 2011, 2012). A detailed key to these nine species was presented by Lü et al. (2012). Six species have been reported from China: *L. bruneri*, *L. cateilea*, *L. japonica*, *L. loekoesii*, *L. subjaponica*, and *L. weii* (Han et al. 2009; Lü et al. 2012; Wang et al. 2007, 2013).

A further study of specimens collected from China has revealed a new *Lecanora* species, described here as *L. shangrilaensis*.

Materials & methods

The specimens studied are housed in the Lichen Section, Botanical Herbarium, Shandong Normal University, Jinan, China (SDNU) and the Lichen Herbarium, Liaocheng University, Liaocheng, China (LCU-L).

Thalli were examined and measured under a COIC XTL7045B2 stereo-microscope and photographed with Olympus SZX16. The anatomical characters (e.g., apothecial sections, crystalline types, asci, ascospores) were examined by hand-cut sections under an Olympus CX41 polarizing microscope and photographed with an Olympus DP72 attached to a Olympus BX61 light microscope. The specimen was chemically analyzed using spot tests and thin layer chromatography (TLC) with solvent system C (Orange et al. 2010).

Taxonomy

Lecanora shangrilaensis Z.T. Zhao & L. Lü, **sp. nov.** PLATE 1

MYCOBANK MB812187

Differs from other multispored *Lecanora* spp. by its production of usnic acid instead of atranorin and its epruinose discs with coarse granular epihymenium.

TYPE: China. Yunnan Province, Shangrila, Tianshengqiao, alt. 3500 m, on cones of *Pinus* sp., 3 Nov. 2008, Wang 20083559 (**Holotype**, SDNU; **isotype**, LCU-L).

ETYMOLOGY: The epithet refers to the county where the species was collected.

THALLUS crustose; surface whitish to yellowish gray, thin, continuous, with yellowish verruca, esorediate; margin indistinct; prothallus not visible. APOTHECIA lecanorine, sessile to constricted at the base, 0.2–0.5 mm diam; disc yellow to yellowish brown, epruinose, plane to slightly concave; margin concolorous with thallus, thick, prominent, entire, smooth. AMPHITHECIUM with small crystals soluble in K; cortex distinct, with crystals soluble in K, basally not thickened, 30–50 µm thick; algal layer 20–35 µm thick; PARATHECIUM hyaline; EPIHYMENIUM brown to dark brown, pigment soluble in K, with coarse crystals soluble in K, 15–20 µm thick; HYMENIUM hyaline, 40–50 µm thick; HYPOTHECIUM hyaline, 20–45 µm thick; SUBHYMENIUM hyaline, 10–20 µm thick; PARAPHYSES simple, slightly thickened apically, ≤2.5 µm diam.; ASCI clavate, containing 12–16 spores; ASCOSPORES hyaline, simple, ellipsoid, 7.5–12.5 × 5–7.5 µm, wall <1 µm thick. PYCNIDIA not observed.

CHEMISTRY: cortex K–, C–, KC+ yellow, P–; medulla K–, C–, KC+ yellow, P–; usnic acid and fumarprotocetraric acid present.

ECOLOGY & DISTRIBUTION: The new species was found on pinecones from Tianshengqiao, Yunnan Province, southwestern China, at an altitude of 3500 m.

ADDITIONAL SPECIMENS EXAMINED: CHINA. YUNNAN PROVINCE, Shangrila, Tianshengqiao, alt. 3500 m, 3 Nov. 2008, H.Y Wang 20083505, 20083506 (SDNU).

REMARKS: *Lecanora shangrilaensis* is characterized by a thin thallus, yellowish discs, coarse granular epihymenium, 12–16-spored ascus, pinecone

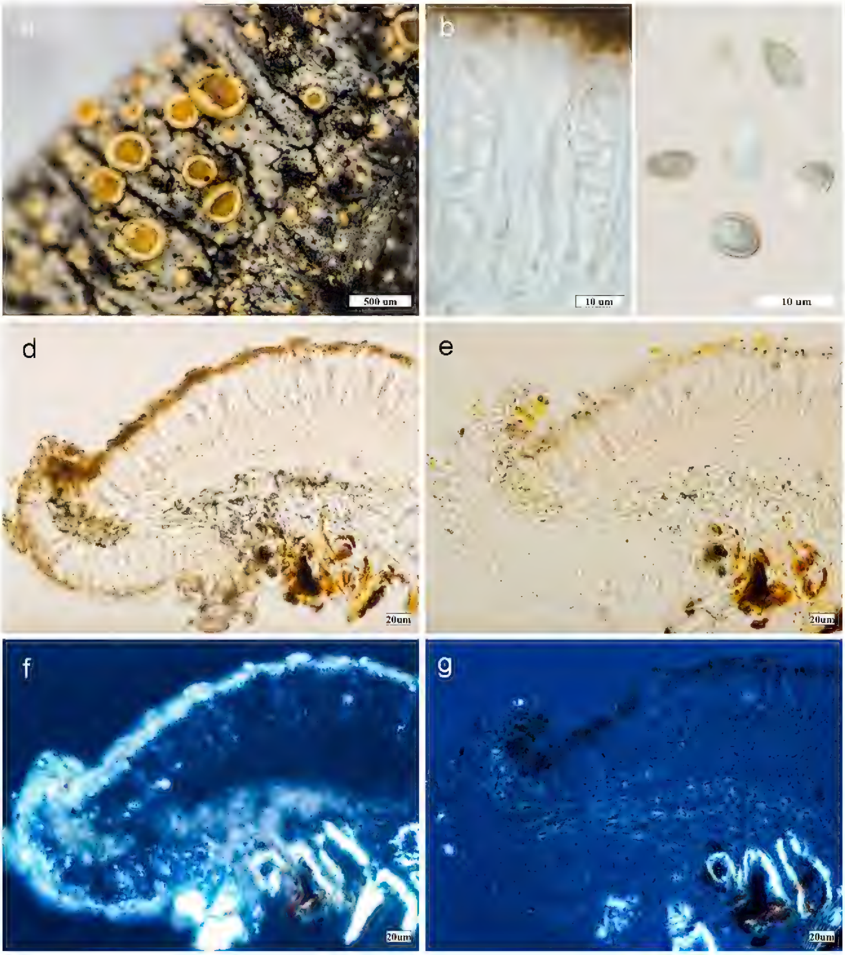

PLATE 1. *Lecanora shangrilaensis* (holotype, SDNU 20083559). a, Thallus. b, Asci. c, Ascospores. d, Apothecium section. e, Pigment of epihymenium soluble in K. f, Crystals in apothecium section. g, Crystals of amphithecium and epihymenium soluble in K. Scale bars: a = 500 µm; b, c = 10 µm; d–g = 20 µm.

substrate, and presence of usnic and fumarprotocetraric acids. The most diagnostic character for recognizing the new taxon is the presence of usnic acid instead of atranorin. *Lecanora cateilea*, *L. loekoesii*, and *L. weii* resemble *L. shangrilaensis*, but differ in several characters: *L. cateilea* is distinguished by heavily pruinose apothecial discs, 8–12-spored asci, and possession of psoromic acid and atranorin as secondary metabolites; *L. loekoesii* produces amphithecia with large crystals and atranorin and lacks phenolic compounds; and *L. weii* produces heavily pruinose apothecial discs and a *chlarotera*-type epihymenium. *Lecanora shangrilaensis* can be distinguished from other multispored species by the presence of usnic acid instead of atranorin and the yellowish apothecia. Morphologically the new species is similar to *L. polytropa* (Ehrh.) Rabenh., which also has a thin thallus and yellowish apothecial discs, but which has only 8 spores per ascus.

Acknowledgements

The study was financially supported by the National Natural Science Foundation of China (31300018). The first author thanks SDNU for providing laboratory facilities to work. The authors also thank Drs. Shouyu Guo (Institute of Microbiology, Chinese Academy of Sciences, Beijing) and Sergey Kondratyuk (M.H. Kholodny Institute of Botany, Kiev) for presubmission review.

Literature cited

Giralt M, Gómez-Bolea A. 1991. *Lecanora strobilinoides*, a new lichen species from north-eastern Spain. Lichenologist 23(2): 107–112. https://doi.org/10.1017/S0024282991000270

Guderley R, Lumbsch HT. 1999. Notes on multispored species of *Lecanora* sensu stricto. Lichenologist 31: 197–210.

Han LF, Zhao JC, Guo SY. 2009. *Lecanora weii*, a new multispored species of *Lecanora* s. str. from northeastern China. Mycotaxon 107: 157–161. https://doi.org/10.5248/107.157

Lü L, Joshi Y, Elix JA, Lumbsch HT, Wang HY, Koh YJ, Hur JS. 2011. New and noteworthy species of lichen genus *Lecanora* (*Ascomycota*; *Lecanoraceae*) from South Korea. Lichenologist 43(4): 321–329. https://doi.org/10.1017/S0024282911000144

Lü L, Zhang LL, Liu XL, Zhao ZT, Wang HY. 2012. *Lecanora subjaponica*, a new lichen from China. Lichenologist 44(4): 465–468. https://doi.org/10.1017/S002428291200014X

Orange A, James PW, White FJ. 2010.Microchemical methods for the identification of lichens. 2nd edition. London: British Lichen Society.

Wang CL, Sun LY, Ren Q, Zhao ZT. 2007. A preliminary study of multispored *Lecanora* from Mt. Taibai. Mycosystema 26(1): 46 – 50.

Wang HY, Ge AN, Li HM, Zhao ZT. 2013. Additional information on *Lecanora loekoesii*. Mycotaxon 123: 235–239. https://doi.org/10.5248/123.235